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## New Data on Fresh-water Tortoises (Testudines, Emydidae) from the Middle Oligocene of the Turgay Basin (Kazakhstan U.S.S.R.)

[Pp. 37.—44, pl. VII—X; 2 text-figures]

Nowe dane o słodkowodnych żółwiach (Testudines, Emydidae) ze środkowego oligocenu Niecki Turgajskiej (Kazachstan, ZSRR)

Новые данные о пресноводных черепахах из среднего олигоцена Турагайской впадины (Казахстан, СССР)

**Abstract.** This paper contains a description of two new species of tortoises, *Ocadia turgaica* n. sp. (Batagurinae) and *Chrysemys lavrovi* n. sp. (Emydinae), from the Oligocene layers — rich in fossil vertebrates — of the Turgay Basin in Kazakhstan. A discussion of the systematic position of these forms and of the Asiatic members of the genus *Chrysemys* GRAY, 1844, is also given.

## INTRODUCTION

In the last quarter of the present century a rich chelonian material has been collected from different localities of the Turgay Basin (BELAYEVA, 1948; LAVROV & BASHANOV, 1948; KHΩZATZKY, 1967 and others). Most of these localities include the layers of the Chilikinskaya formation, which stretches over an extensive area in central Kazakhstan. The Chilikusha formation (= Kendyrlikcha = *Indicoterium* formation) has recently been referred to the Middle Oligocene (ROZHDESTVENSKY, 1968).

In connection with the acquisition of new materials (the authors' collection) of fossil chelonians from the Chilikusha formation it became possible to add new data to those published so far (KUZNETSOV, 1955; CHIKHIVADZE, 1969, 1971a, 1971b). The tortoises of the family Emydidae are represented in this material by two species, *Ocadia turgaica* n. sp. and *Chrysemys lavrovi* n. sp., which are described here for the first time. These species (especially *Ocadia*

*turgaica* n. sp.) seem to be dominant in all the Middle Oligocene localities of the Turgay Basin and for this reason they may be important to biostratigraphy.

Chelonians of the family Platysternidae (Pl. VIII) have already been reported from the locality Myneseksuyek. The occurrence of members of the Dermatemydidae in it, published previously, has not been confirmed (KUZNETSOV, 1963, 1964).

Recently, the following chelonians have been found beside the forms identified earlier from the Middle Oligocene of the Turgay Basin: *Chelonia* sp. (Cheloniidae), *Trionyx ninae* CHKHIKVADZE (Trionychidae), *Planiplastron tatarinovi* CHKHIKVADZE (Platysternidae), new species described here, *Ocadia turgaica* n. sp. and *Chrysemys lavrovi* n. sp., and Testudinidae genus & species indet.

The terminology of shell elements used in this paper differs slightly from that applied before by CHKHIKVADZE (1973). Abbreviations used: INZ — Institute of Zoology, Kazakh S. S. R. Academy of Sciences; IP — Institute of Palaeobiology, Georgian S. S. R. Academy of Sciences.

**Acknowledgments:** We wish to express our deep gratitude to Dr. Dr. V. V. LAVROV, M. D. BIRINKOV and V. S. BASHANOV for giving us access to the materials used in this study. We thank Dr. M. A. BAKRADZE for taking some of the photographs for this paper.

#### DESCRIPTIVE PART

**Family: Emydidae GRAY, 1873**

**Subfamily: Batagurinae GRAY, 1869 emend. McDOWELL, 1964**

**Genus: *Ocadia* GRAY, 1870**

**Species: *Ocadia turgaica* n. sp.**

(Text-fig. 1, Pl. VII, 1—4, Pl. VIII, 1—7, Pl. IX, 1—3, 141—3, Pl. X. 7—12)

1955. *Clemmys* sp. (part), KUZNETSOV, p. 71, Figs. 1—3; Pl. 2, Figs. 1—2; Pl. 3, Figs. 3—4

1963. *Clemmys turgaica* (Nomen nudum!), KUZNETSOV, p. 6.

1964. ?*Ocadia* sp., SUKHANOV, p. 403.

1969. *Clemmys kazachstanica* KHOSATZKY, 1947 CHKHIKVADZE, p. 146.

1973. "Clemmys" *turgaica* KUZNETSOV, CHKHIKVADZE, p. 146.

**Holotype:** right epiplastron with hyoplastron (Pl. VII, 1—2), INZ Nr 339 (KUZNETSOV, 1955, Pl. 2, Fig. 1).

**Type locality:** central Kazakhstan, Turgay Basin, locality Myneseksuyek.

**Type stratum:** Middle Oligocene, Chilikitinskaye layers.

**Nomen derivation:** „*turgaica*“ after the Turgay Basin.

**Material:** From the Myneseksuyek locality (INZ): 8 nuchals, 12 neurals, 30 costals (= pleurals), 4 suprapygals, 2 pygals, about 120 peripherals, 26 epiplastral plates, 96 entoplastra, 7 hyxoplastra, 5 hypoplastra and 5 xiphoplastra. From the localities at Chelkar-Teniz, Djanaj-Choku and Donguz-Tau (IP): 5 nuchals, 20 epiplastrals, 15 entoplastra, 7 hyoplastra, 10 hypoplastra and 4 xiphoplastra.

**Diagnosis:** Carapax length — 20—25 cm. Carapax with poorly marked

keels, of which the medial is more distinct than the lateral ones. Buttresses well developed, extend up to one-third of the length of costal plate 1 and to 5 and 6. Anterior edge of epiplastra even and with small medial notch. Lower surface of epiplastra covered with humeral shields. The gular projection and cylindrical gular thickening of epiplastral lips are distinct on the epiplastron. There are no vestigial gular (= intergular auct.) shields. The intergular (= gular auct.) shields slightly overlap the anterior part of the entoplastron. The anterior part of the entoplastron is somewhat narrowed and its posterior part widened. It lies in front of the humeropectoral sulcus, which sometimes crosses only its posterior part.

The sulcus between the last vertebral (central) shield and the marginal shields extends in the posterior part of the 2nd suprapygial plate (batagurine character).

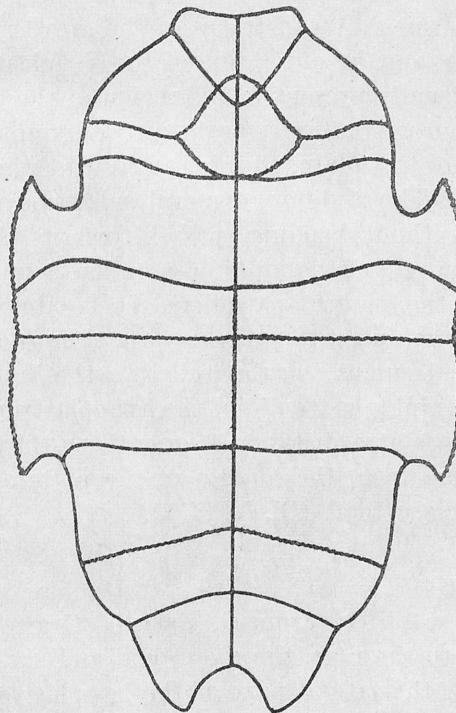


Fig. 1. *Ocadia turgaica* n. sp. Del. V. M. CHKHIKVADZE and B. MALCZEWSKA

**Description:** The surface of shell plates is smooth, only the growth lines of the horny layer being marked. The margin of the carapace is even, unserrated. Costal shield 1 does not overlap the nuchal plate. There are two suprapygals. The pygals are longer than wide and covered by the last marginal shields. The free anterior margin of the epiplastron is smaller than the lateral margin of this plate. The dermoscutal sulcus, visible on the inner surface of the epiplastron, is clearly distant from the free margin in its posterolateral part and comes near

it in the region of the interepiplastral symphysis. The lyre-shaped nuchals have a poorly marked medial notch of the free anterior margin. The inner surface of the nuchal is concave. The nuchal (cervical) shields is trapezoidal, with wavy posterior margin; ventrally, it is rectangular in shape. The neural plates, except the first one, are hexagonal, with short anterolateral margins. A slightly convex transverse ridge is seen in the medial portion of the dermoscutal sulcus on the internal surface of the epiplastra. The hyoplastra, thin posteriorly and postero-laterally, are comparatively robust in the regions of junction with the epi- and entoplastron. The free lateral margins of the hyoplastron are massive. The entoplastral notch of the hyoplastron is not very deep and the humeropectoral sulcus is directed somewhat backwards in the region of the medial line of the plastron. The part of the pectoro-abdominal sulcus lying more or less medial to the hyohypoplastral suture is strongly bent backwards in the lateral region. The pectoral shields are broader than the hyoplastron-covering part of the abdominal shield. Weak traces of the growth lines of horny shields occur at the medial line on the outer side of the hyoplastra. An inconsiderable but distinct notch is usually present in the region of the intersection of the humeropectoral sulcus and the lateral margin of the hypoplastron; consequently, the anterolateral part of this plate, situated in front of the sulcus, seems to protrude into the outside. The abdominofemoral sulcus begins at the base of the inguinal notch and, without bending, passes towards the medial line of the plastron. The lateral margin of the xiphoplastron has a small notch in the region of its intersection with the femuro-anal sulcus. The anal notch is oval, semilunar, wider than deep. The xiphoplastral processes are thin and more or less sharply ended. The femoro-anal sulcus is subparallel to the hyohypoplastral suture. In the region where the xiphoplastron joins the hypoplastron, on the inner surface, the dermoscutal sulcus is at a distance of about one-third of the length of the hypoxiphoplastral suture from the margin of the plate and in the area of the anal notch it comes close to it (Pl. VIII 2).

### Comparisons

*Ocadia turgaica* n. sp. differs from *O. sinensis* (Gray) in its humeropectoral sulcus shifted further to the rear, the more oval and shallower anal notch, the presence of a notch in the lateral part of the hyoplastron (character frequent in *O. turgaica*), the wider posterior part of the entoplastron and the more distinct intergular notch in the medial part of the epiplastra.

From *O. perplexa* GILMORE, 1931 it differs in its humeropectoral sulcus, more turned out to the back, the wider posterior part of the entoplastron and the wider and oval anal notch.

### Distribution

Localities Myneseksuyek, Kyzylkah, Chelkar-Teniz, Donguz-Tau, Atam-Basching, Djanaj-Choku in the Turgay Basin, Central Kazakhstan, Kazakh S. S. R. Chilikitinskaye layers of the Middle Oligocene.

Note: According to the data acquired so far, in their morphology the shell remains of fresh-water tortoises come fairly close to the remains of *O. turgaica* found in the Middle Oligocene layers of Mayliba, Tologay and Podrozhnik in the Zaysan Basin in the eastern part of the Kazakh S. S. R. (collection of V. M. CHKHIKVADZE and N. S. SHEVERIEVA from the years 1971—1974).

Subfamily: *Emydinae* GRAY, 1825 emend. McDOWELL, 1964

Genus: *Chrysemys* GRAY, 1844

Species: *Chrysemys lavrovi* n. sp.

(Text-fig. 2; Pl. IX, 2, Pl. X, 1—6)

1955. *Clemmys* sp. (part) KUZNETSOV, Pl. 3, text-fig. 5—6.

Holotype: right plastron (Pl. 2—3), INZ No. 588.

Type locality: Myneseksuyek, Turgay Basin, Central Kazakhstan.

Type layer: Chilikitinskaye layers, Middle Oligocene.

Name derivation: „*lavrovi*” to commemorate V. V. LAVROV, geologist.

Material: In addition to holotype, 3 nuchals, 3 epiplastra, 1 entoplastron, 2 xiphplastra and many other small shell fragments probably of specimens of same species. Collections of IP and INZ.

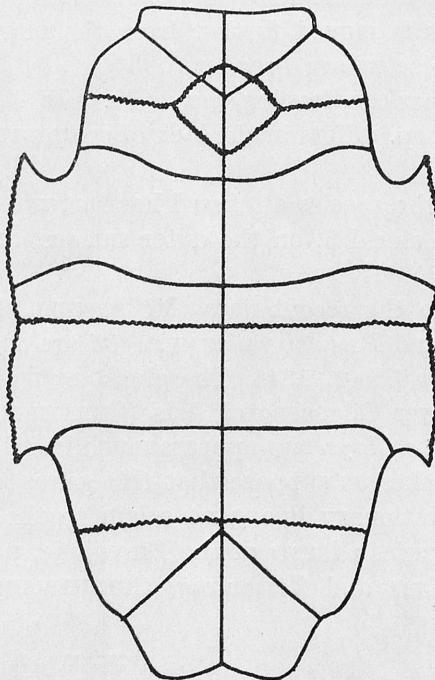


Fig. 2. *Chrysemys lavrovi* n. sp. Del. V. M. CHKHIKVADZE and B. MALCZEWSKA

Diagnosis: Carapace length 20—25 cm. Outer surface of shell smooth. No traces of growth lines of horny layer. Nuchal (cervical) shield quadrangular, with parallel side margins and straight posterior margin. Costal (lateral) shield 1

overlapping lateral margin of nuchal. Anterior margin of epiplastra without medial notch. Gular part of epiplastra projecting distinctly. In the lateral part of the epiplastron the dermoscutal sulcus is distant from its margin, whereas anteriorly, in the medial part, it approaches this margin markedly. There is no vestigian gular (intergular auct.) shield on the inner surface of the epiplastra. The gular ridges on the epiplastral lips are well developed. The humero-intergular sulcus crosses the epi-entoplastral suture in such a manner that it divides it into two subequal parts. The lengths of the anterolateral margins of the epiplastra are nearly equal. The xiphplastra are relatively short and broad, narrowing moderately in the caudal part. The anal notch is triangular and deep. The xiphplastral processes are thin and ovaly ended. The femoro-anal sulcus in its medial part runs close to the hypoxiphplastral suture and in the lateral part the distance from this sulcus increases.

### Comparisons

*Chrysemys lavrovi* n. sp. differs from *Chrysemys index* CHKHIKVADZE, 1971 in the smooth surface of the shell, the gular portion of the epiplastra, well-developed and protruded forward, the wider and shorter xiphiplastron and the deeper anal notch. *Chr. lavrovi* n. sp. differs from *Chr. polydectes* CHKHIKVADZE, 1973 in the larger size and the relatively more massive shell. In our species the dermoscutal sulcus is moved further from the margin, the anal notch is deeper and the xiphplastra are broader.

From the North American fossil species, *Chr. hilli* i (Cope) and *Chr. trulla*, gilmore, *Chr. lavrovi* n. sp. differs in the lack of sculpture and the deeper anal notch of the plastron.

The pygal plate of the species discussed has furrows of the marginal shields and vertebral (central) shield 5, on the outer surface, and thus it is typical of the Emydinae.

Note: According to the recent data (McDOWELL, 1964), the genera *Trachemys* AGASSIZ, 1887 and *Pseudemys* GRAY, 1855 are assumed to be subgenera of the genus *Chrysemys* GRAY, 1844. The oldest members of this genus have been found in the Lower Oligocene of Asia (CHKHIKVADZE, 1971a, 1973). In North America the genus *Chrysemys* appears much later, not before the Miocene of Loup Fork. This makes us suppose that this genus arose and developed in Asia. The Asiatic evolutionary line gave origin to the American line, which contains numerous American forms of the Emydinae, parallel to the Eurasian genera *Emys* A. DUMÉRIL and *Zaisanemys* CHKHIKVADZE.

Translated into English  
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## STRESZCZENIE

Z formacji śródwołodziońskich centralnego Kazachstanu (stanowiska Myneseksujek, Kyzıl-Kak, Czelkar-Teniz, Donguz-Tau, Dżanaj-Czoku) poznano dotychczas następujące żółwie kopalne: *Chelonia* sp., *Trionyx ninae* Chkhikradze *Planiplastron tatarinovi* Chkhiqvadze, Testudinidae gen. et sp. indet. oraz przedstawicieli rodziny Emydidae (*Ocadia turgaica* n. sp., *Chrysemys lavrovi* n. sp.),

które zostały opisane w niniejszej publikacji. Pierwszy z nich (*O. turgaica*) charakteryzuje się tylnym położeniem bruzdy humeropektoralnej, co wskazywałoby na przynależność do archaicznej formy z rodzaju *Ocadia*. Drugi gatunek (*Chr. lavrovi*) charakteryzuje się bardziej progresywną budową niż dolno-oligoceński *Chrysemys index* СКНИКВАДЗЕ (zachodni Kazachstan), tj. gładką powierzchnią pancerza, stosunkowo szerokimi ksifiplastrami, zanikiem wycięcia analnego i in.

W Azji znaleziono najstarszych przedstawicieli rodzaju *Chrysemys* (*Chrysemys index* СКНИКВАДЗЕ), co pozwala sądzić, że cała ta grupa żółwi słodkowodnych jest pochodzenia azjatyckiego.

#### РЕЗЮМЕ

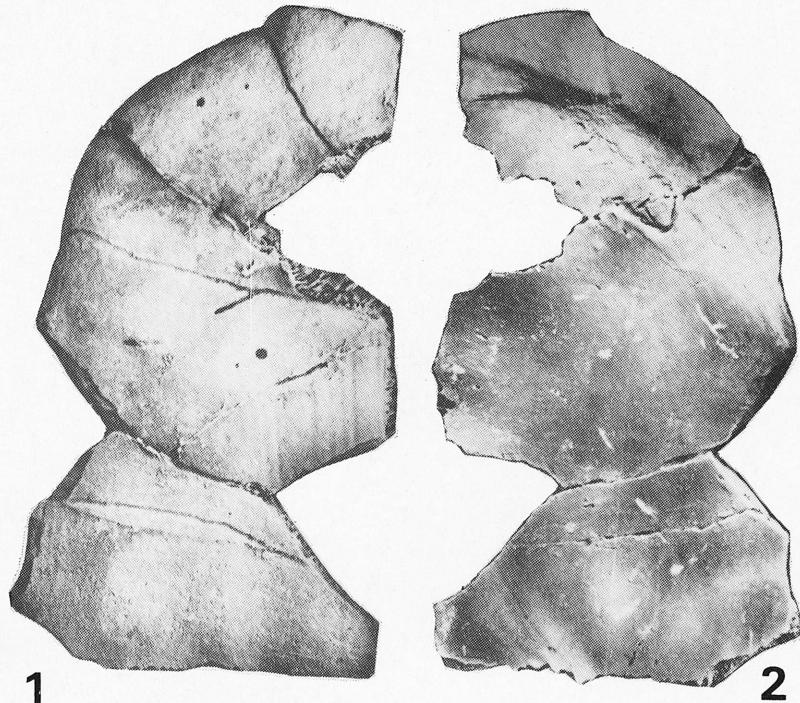
Из среднамиоценовых отложений Центрального Казахстана (местонахождения: Мынсексуек, Кызыл-Как, Челкар-Тениз, Донгуз-Тал, Джанай-чоку) до настоящего времени были известны ископаемые черепахи: *Chelonia* sp., *Trionyx ninae* СКНИКВАДЗЕ, *Planiplastron tatarinovi* СКНИКВАДЗЕ, *Testudinidae* gen. sp. et. indet., а также представители семейства *Emydidae*. Описание двух новых видов *Emydidae* (*Ocadia turgaica* n. sp., *Chrysemys lavrovi* n. sp) впервые приводится в этой статье. Первый из них замечателен задним положением гумеро-пекторальной борозды, что позволяет видеть в нем наиболее архаичного представителя этого рода. Другой вид характеризуется более прогрессивными чем у нижноолигоценового *Chrysemys index* СКНИКВАДЗЕ (восточный Казахстан) признаками строения панциря — гладкая поверхность панциря, относительно широкие ксифипластры, наличие анальной вырезки и др.

В Азии найден наиболее древний представитель рода *Chrysemys* Gray что дает основание считать Азию центром происхождения группы.

#### PLATE VII

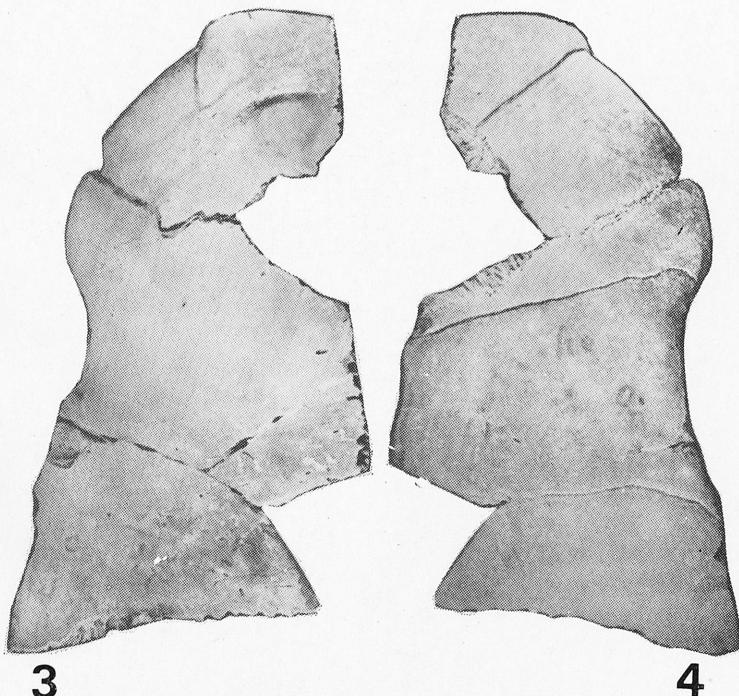
##### *Ocadia turgaica* n. sp.

1—4. the holotype (INZ. Nr 339)



1

2



3

4

PLATE VIII

1—7. *Ocadia turgaica* n. sp., material from different localities  
8. *Planiplastron* sp. from Myneseksuyek

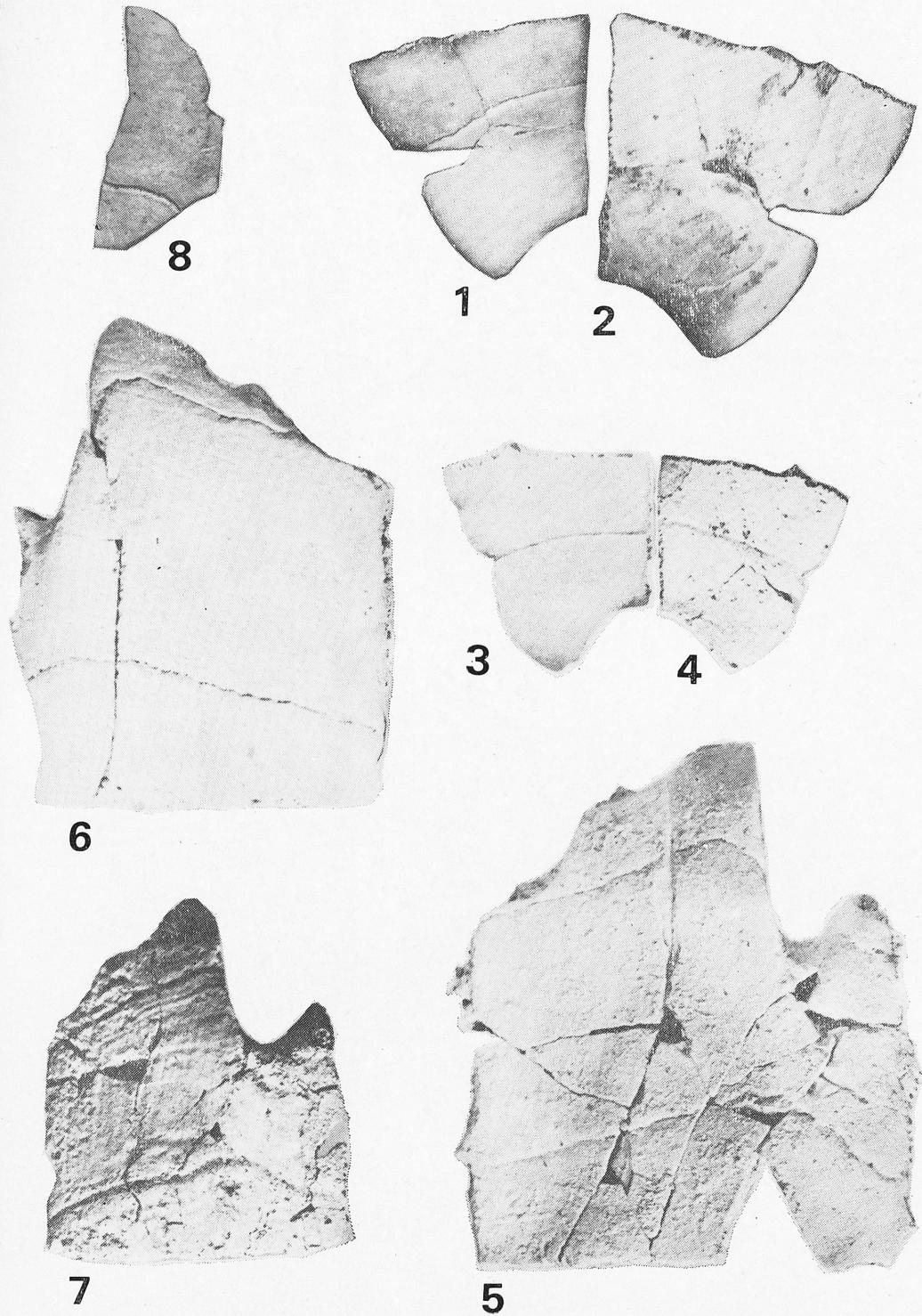


PLATE IX

1—3 and 14. *Ocadia turgaica* n. sp. from different localities  
2. *Chrysemys lavrovi* n. sp. from Chelkar-Teniz (Kur-Saj)

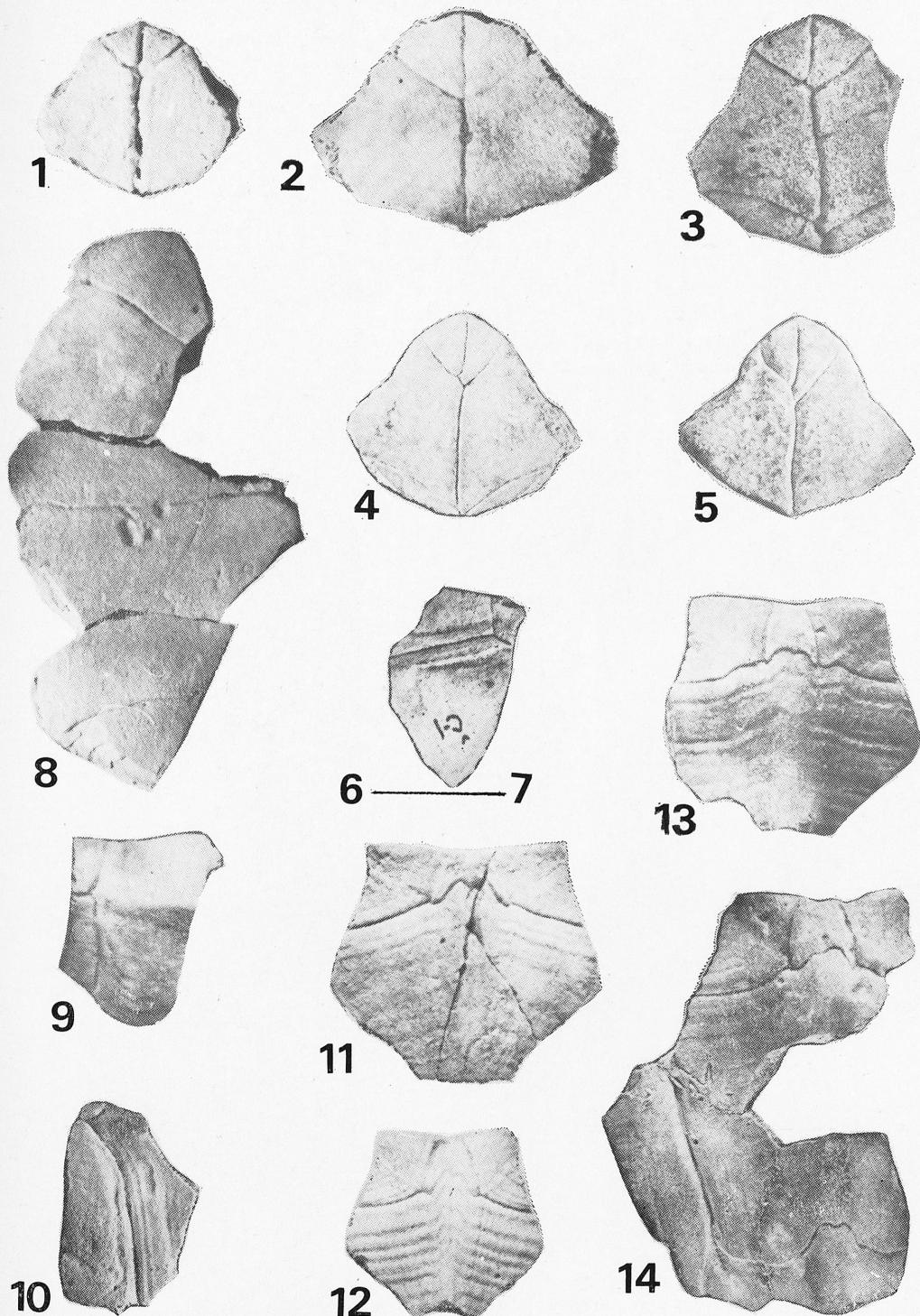
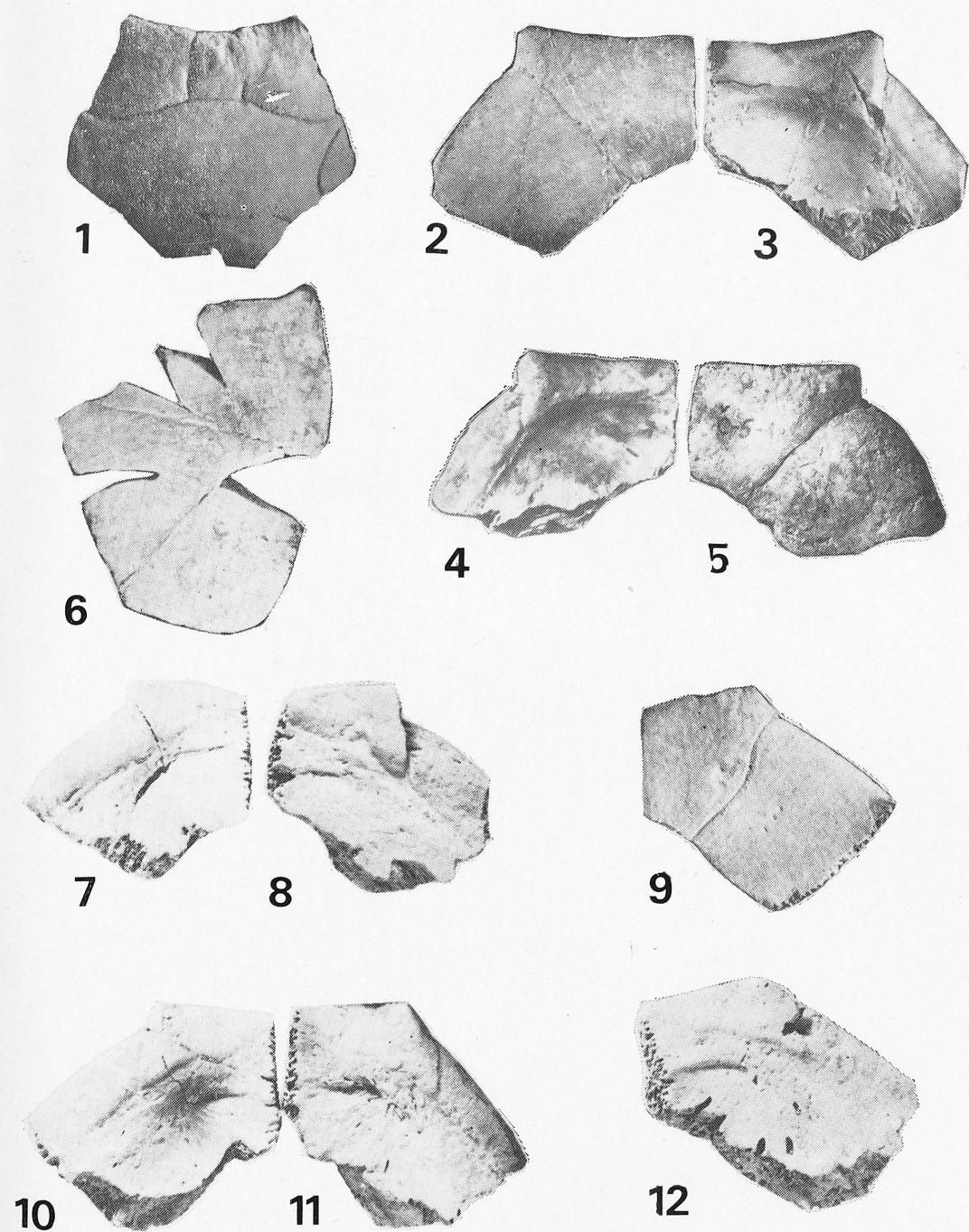


PLATE X

1—6. *Chrysemys lavrovi* n. sp. from different localities

7—12. *Ocadia turgaica* n. sp. also from different localities of Turgay Basin



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